

## CLAIMS

1. An isolated nucleic acid comprising a polynucleotide encoding a polypeptide consisting essentially of SEQ ID NO:2, wherein said polypeptide will crystallize and will have at least one biological activity selected from the group consisting of (a) binding a GSK3 inhibitor; and (b) kinase activity.
2. An isolated nucleic acid comprising a polynucleotide encoding a polypeptide consisting essentially of SEQ ID NO:3, wherein said polypeptide will crystallize and will have at least one biological activity selected from the group consisting of (a) binding a GSK3 inhibitor; and (b) kinase activity.
3. A vector comprising the polynucleotide of claim 1 or claim 2.
4. A polypeptide comprising between about 250 and 419 contiguous amino acids of SEQ ID NO:1, wherein said polypeptide is phosphorylated on tyrosine 216, said polypeptide will crystallize, and said polypeptide will have at least one biological activity selected from the group consisting of (a) binding a GSK3 inhibitor; and (b) kinase activity.
5. A polypeptide consisting essentially of between about 278 and 419 contiguous amino acids of SEQ ID NO:1, wherein said polypeptide exhibits at least 1% of the kinase activity of human GSK3 $\beta$ .
6. A polypeptide consisting essentially of between about 285 and 384 contiguous amino acids of SEQ ID NO:1, wherein said polypeptide exhibits at least 1% of the kinase activity of human GSK3 $\beta$ .

7. A polypeptide consisting essentially of between about 351 and 384 contiguous amino acids of SEQ ID NO:1, wherein said polypeptide exhibits at least 1% of the kinase activity of human GSK3 $\beta$ .

8. A polypeptide consisting of the amino acid sequence of SEQ ID NO:2.

9. A polypeptide consisting of the amino acid sequence of SEQ ID NO:3.

10. An isolated nucleic acid comprising a polynucleotide encoding a polypeptide consisting essentially of SEQ ID NO:5, wherein said polypeptide will crystallize and will have at least one biological activity selected from the group consisting of (a) binding to a GSK3 inhibitor; and (b) kinase activity.

11. The nucleic acid of claim 10 wherein said polypeptide is phosphorylated on tyrosine 279.

12. A vector comprising the polynucleotide of claim 10 or claim 11.

13. A polypeptide comprising between about 182 and 482 contiguous amino acids of SEQ ID NO:4, wherein said polypeptide will crystallize, and said polypeptide will have at least one biological activity selected from the group consisting of (a) binding a GSK3 inhibitor; and (b) kinase activity.

14. A polypeptide consisting essentially of between about 182 and 386 contiguous amino acids of SEQ ID NO:4, wherein said polypeptide exhibits at least 1% of the kinase activity of human GSK3 $\alpha$ .

15. A polypeptide consisting essentially of between about 182 and 351 contiguous amino acids of SEQ ID NO:4, wherein said polypeptide exhibits at least 1% of the kinase activity of human GSK3 $\alpha$ .
16. A polypeptide consisting essentially of contiguous amino acids S<sup>97</sup> to S<sup>447</sup> of SEQ ID NO:1.
17. A polypeptide consisting essentially of the amino acid sequence of SEQ ID NO:5.
18. A polynucleotide encoding a polypeptide consisting essentially of SEQ ID NO:6.
19. A polypeptide consisting essentially of the amino acid sequence of SEQ ID NO:6.
20. A polynucleotide encoding a polypeptide consisting essentially of SEQ ID NO:7.
21. A polypeptide consisting essentially of the amino acid sequence of SEQ ID NO:7.
22. A polynucleotide encoding a non-phosphorylated human GSK3 polypeptide, wherein said non-phosphorylated polypeptide differs from native GSK3 in at least one and not more than ten amino acids.
23. The polynucleotide of claim 22 wherein tyrosine at position 216 of SEQ ID NO:1 is substituted for by a non-phosphorylatable amino acid.

24. The polynucleotide of claim 23 wherein said non-phosphorylatable amino acid is phenylalanine.

25. The polynucleotide of claim 22 wherein tyrosine at position 279 of SEQ ID NO:4 is substituted for by a non-phosphorylatable amino acid.

26. The polynucleotide of claim 25 wherein said non-phosphorylatable amino acid is phenylalanine.